On the Operations Job Market: Reflections and Insights

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Abstract

This document aims to provide some reflections and insights about the academic job market in the field of Operations Management (OM). The target readers are the PhD students who wish to find a tenure-track Assistant Professor position in Operations Management at a business school[1]. I start with a brief introduction of OM academia's fundamental mechanism, based on which a simple mathematical model is built to illustrate the main attributes that will impact a candidate's performance on the OM job market. I also discuss the implications of this model on a job market candidate's preparation strategies both at the pre-job market stage and during the job market season.

1 Introduction

As a 5th year PhD candidate in the Operations Management program of a US Business School (Olin Business School of Washington University in St. Louis), I have just finished the 5-month long painful process of finding a tenure-track Assistant Professor job on the OM job market. This might be a good time for me to reflect on this market and, hopefully, provide some insights and suggestions for prospective OM job market candidates. This document summarizes my *personal* reflections and suggestions about the job market. My hope is that this document will be a helpful reference for PhD students who wish to find a tenure-track Assistant Professor job in Operations Management, and pursue the academic career in this field. It may also be a useful resource if a senior professor sitting in the recruiting committee would like to see a recent candidate's perception about the OM job market.

Many professors from different fields have shared their thoughts about their respective academic job market[2]. Although these sharings are very helpful and have actually inspired some of my own ideas, this document does distinguish itself from them with the following two unique features:

- Most earlier advice for faculty job search only discusses the dos and don'ts of a candidate who *has already been on the academic job market.* However, I think, in most cases, what

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[1]Whenever possible, I will comment on how the implications of this document can (or cannot) be generalized to seeking for a faculty job in Industrial Engineering and Operations Research (IEOR) or in other fields at a business school (e.g. Finance, Marketing, Accounting, and Organization Behavior).

[2]I include a couple of them in Section **??** for readers' reference.

a candidate does in the job market season may not have a huge effect on his/her job market success (or failure). So the focus of this document is not on the detailed guidance for the job market season itself. Instead, I try to unveil the underlying mechanism of the operations job market, based on which I give some advice on what a PhD student should do in the first 4 years of his/her doctoral study to improve his/her competitiveness on the OM job market.

- I build a simple mathematical model to illustrate the key attributes that will influence the competitiveness of an OM job market candidate. I also discuss the implications of this model, and share some executable suggestions for PhD students both at the pre- job market stage and during the job market season.

There are quite a few reasons why I write this document. The first and the foremost reason is that, throughout my doctoral study and, in particular, during my job search process, I have received tremendous help from my advisors, some professors from Olin Business School, and my friends and colleagues. So I am very enthusiastic about passing such help to the prospective job market candidates and emerging scholars in our field. Second, I have invested significant amount of time and effort in understanding how the operations job market works, and I hope my effort could somehow benefit more people. Third, although I did put a lot thoughts on the OM job market before going onto it, my understanding of its mechanism has some substantial updates after I actually went through this exciting process. Thus, I believe the reflections on these updates would be of some value to the inexperienced prospective job market candidates who are now trying their best to navigate the daily challenges towards their PhD degree. Last but not least, writing this document gives me a good excuse to rethink the OM academia, and have myself mentally prepared for my exciting new job at New York University Shanghai that will start in this Fall.

Before proceeding into the detailed reflections, I would like to make a disclaimer: I have *never* been sitting on the recruiting committee of a faculty position, so I have little idea how the recruiting committees actually think and make decisions. Our model and advice mainly stem from (a) my own job market experience, (b) my observations of the market outcomes from 2013 to 2016, and (c) some sharings of the professors who have been in recruiting committees. I believe they should work at a generic level, but please discuss with your advisor(s) and use your own discretion to judge whether and how the insights and suggestions apply to your particular case.

1.1 Preview of this Document

To conclude this section, I would like to give a preview of the rest of this document.

Brief description of the OM academia. (Section **??**.) I briefly discuss the mechanism of the OM academia and the expectation of a candidate on his/her job as an academic in the OM field.

Model for the OM job market. (Section **??**.) This is the core section of this document. I develop an innovative mathematical model to illustrate the main attributes that will impact a candidate's competitiveness on the OM job market.

Model implications for students not on the market yet. (Section **??**.) The model has rich implications for PhD students. In this section, I focus on how a student could improve his/her market value before s/he actually goes onto the job market. From the application perspective, this is the most important part of this document.

Model implications for students already on the market. (Section **??**.) This section focuses on the implications of our model for the candidates who are already on the OM job market.

Conclusion. (Section **??**.) I conclude this document with some references to other useful resources for faculty job search.

2 Operations Academia in a Nutshell

The goal of this section is to give the readers a general (brief) introduction of the OM academia. Our focus will be on the fundamental mechanism of the OM academia and its implications upon individual scholars.

2.1 Mechanism of the Operations Academia

Operations Management is an area of business/management that studies the design, procurement, production, and delivery of (physical) goods and services. The OM academia is a research community of scholars (professors, research scientists, post-docs, and PhD students) that do *the business of knowledge in the OM field*. Such "business of knowledge" is not that different from the usual businesses. From an OM perspective, it delivers two "products": knowledge creation (i.e., research in the field of OM) and knowledge communication (i.e., education/teaching in the field of OM). With these two products, the OM academia can gain some money to produce more research and teaching. Hopefully, this cycle could keep moving sustainably in the long run at the community, institution, and individual researcher levels. For the rest of this section, I would like to introduce in a bit more detail two of the three key components of this cycle: money and research. The discussions in this section will become the building blocks of our subsequent model and advice. The teaching component will be covered in later sections.

2.1.1 Money

Like every other business in this world, the survival and prosperity of the academia business relies heavily on whether it could obtain enough money to cover its operations cost in research and teaching. For the OM field, the way we get money is from various educational programs in business schools[1], such as MBA, PMBA, EMBA, Undergraduate, Master of Supply Chain Management, and Master of Analytics, etc. This fact has an important implication for an individual professor in OM: The minimum requirement is being able to teach something that are of interest to the students from one of the aforementioned programs. Since research and teaching have very high positive correlation, another more implicit implication for PhD students would be that, they should pursue the research that has close connection with the current market trends in practice.

There are also quite a few professors in engineering schools (usually the IEOR departments) that do research and teaching in the field of OM. For them, the story of money is totally different. A professor in an IEOR department funds his/her research and teaching from the government via grants. More specifically, s/he produces research that the government finds interesting and relevant to the society, and the government provides grants to support his/her

[1]This also applies to all other fields in business.

future research. Therefore, for a professor to survive and thrive in an IEOR department, s/he has to do the research that the *government cares about*.

The fundamental economics of the OM academia does have phenomenal impact upon the OM market, which I will explain in later sections.

2.1.2 Research

In this document, I define research as academic research with the primary purpose of advancing the frontier of human knowledge[1], i.e., doing research is the process of creating knowledge. For most scholars in the OM academia, their most important task is probably to produce original research that leads to publications in top-tier scholarly journals in OM[2]. As a result, the PhD students in OM are also primarily trained to do academic research and to publish research papers in well-recognized journals in our field.

Publication criteria. The academic publication system is probably the core mechanism of the OM academia (actually it is the center of the research community of any academic field in this world). Among others, the publication record of an OM professor is widely considered as the most important (sometimes the *only*) indicator of his/her scholarly contribution to the field. We say "to publish or to perish" to emphasize the importance of publication for a scholar from the survival perspective. At the core of the academic publication system is the so-called *peer-review system*. That is, the scholarly contribution of a research paper and whether it should be published in an academic journal is judged by a few other researchers (i.e., the peer-reviewers) that are supposed to be experts in the field. The key to navigate the publication game is, therefore, to convince these experts that your paper does make a significant contribution to the body of knowledge in the OM field. Here the key words "significant contribution" are vague and subjective. To get a sense about what criteria the reviewers will use, I would like to quote the publication criteria of *Manufacturing & Service Operations Management (M&SOM)*, which is a top journal of the OM field. Other journals in OM should share more or less the same criteria when judging whether a paper should be published therein. The following statements of criteria are directly copied from the website of *M&SOM*[3].

- **Importance of the problem or issue**: What is the focal problem, issue, or phenomenon for the research? Is this focal point of sufficient importance to OM to warrant consideration by the journal? Why? What evidence is provided that the paper addresses a significant issue for operations managers in some context? What is the potential impact from addressing the problem or issue?
- **Relevance of the research**: Is the research relevant to the problem or issue? Do the research results provide an applicable solution to the problem, or a potential pathway to solve the problem? Does the research provide meaningful, actionable insights into an issue or phenomenon? Are there lessons from the research that can be applied to practice or taught to operations managers? What evidence is provided for the relevance of the research?

[1] Application oriented research, such as to design the supply chain structure to reduce the cost of delivering *a specific product for a specific company*, is generally not required for tenure and promotion in a university, so my focus will not be on this type of research.

[2] Journals, as opposed to conferences, are the primary outlets for OM research works.

[3] See `http://pubsonline.informs.org/page/msom/editorial-mission`.

- **Rigor of the research**: Are the research approach, methods, and execution sound, as judged by the scholars from the relevant research community? Are the results correct? Are the results convincing? Does the paper position its contribution relative to the relevant literature?

- **Innovation**: What is innovative or original about this research? Is there novelty in the framing of the research question, or the research methodology and analysis? Is this a creative use of existing methods or models? What are the implications from these innovations for subsequent research?

- **Clarity**: Is the paper clearly written? Is it reasonably concise? Is its length consistent with its contribution? Would the typical reader of the journal be able to understand and appreciate the contributions from the paper?

I would like to share my understanding of the five criteria *M&SOM* employs to evaluate papers (**importance of the problem or issue**, **relevance of the research**, **rigor of the research**, **innovation**, and **clarity**), and try to share some executable suggestions for OM PhD students to improve his/her research capability. I will also use a recent paper published in *Operations Research* (another top OM journal) by Xuan Wang and Jiawei Zhang (Wang and Zhang 2015) to illustrate how these criteria could be well met in a paper. This paper also won the first place in the 2013 MSOM Student Paper Competition, which is the most prestigious student paper award in the OM field.

Doing research is essentially the process of providing answers to a problem that nobody has an answer yet. The **importance of the problem or issue** criterion concerns the question a research tries to address, whereas the **relevance of the research** criterion concerns the answers this research has for the question, and how it gets there, whereas the **rigor of the research** criterion concerns the scientific soundness of the path to the answer. Taking the question, the answer, and the path from question to answer all into account, the **innovation** criterion concerns the difference between the focal research and other existing research. Finally, the **clarity** criterion concerns the quality of the paper's writing.

Importance of the problem or issue. My understanding of this criterion is that the problem your research tries to solve is something that other scholars in the OM community care about. Or, other scholars in OM are willing to know the answer to the issue your research is considering. In general, the importance criterion is easy to meet at the general topic level, but difficult at the specific research question level. That is, it is easy for you to identify a "hot" topic to work on, but it is not necessarily the case you can ask the right questions related to that topic.

Relevance of the research. This criterion essentially requires that your research gives "good" answer(s) to the question(s) you try to address. Most importantly, your answer(s) has to be something that other OM scholars care about and find interesting. In addition to the answer itself, the relevance of the research criterion could also be met by demonstrating that your path of getting the answer is interesting, and has the potential to be used by other OM researchers to address other research problems, i.e., your paper contains some methodological contribution therein.

Rigor of the research. This criterion requires that the analysis in your research should be accepted by the OM community. In other words, your research method should be scientifically sound, so that your findings are, at least, correct and convincing.

Innovation. I think innovation is the core criterion among all five, since research should create new knowledge. To meet the innovation criterion, your research should be substantially different from the existing literature in the question(s) you try to address, and/or the answer(s) you provide to the question, and/or the approach you use to get the answer(s).

Clarity. The first 4 criteria concern the research but not the paper, whereas the clarity criterion is more on the paper itself. This criterion requires that the paper is a good media between the authors and the readers, so that, by reading this paper, other researchers in the OM community could understand the importance of the problem or issue, the relevance of the research, the rigor of the research, and the innovation of the paper.

Illustration of the publication criteria. Let me now discuss how these publication criteria can be well met with an example of Wang and Zhang (2015).

Importance of the problem or issue. The topic of Wang and Zhang (2015) is on a central topic of OM: the value of resource flexibility to a system under uncertainty, which has been extensively studied under various settings since the birth of the OM field. The specific question this paper tries to address is also appealing: What (worst-case) distribution-free bounds can we have for the performance of the well-known long-chain structure relative to the full flexibility system? People working on process flexibility were curious to know the answer to this question, since it can provide deep insights on the robustness (or non-robustness) of the long chain structure in process flexibility design.

Relevance of the research. The answers Wang and Zhang (2015) provides to their question are very elegant. The authors show that the performance of the long-chain structure relative to the full flexible system has a closed-form asymptotic lower bound. Moreover, this analytic bound only depends on the mean and standard deviation of the demand distribution, but compares very well with the performance ratio if the full demand distribution is known. There are two key elements in their findings that the OM community welcomes: (a) The bound is in analytic form and, thus, it is easy to compute; and (b) The bound uses partial information of the demand distribution but compares well with the performance ratio that uses full demand distribution information, which highlights the robustness of the result.

Rigor of the research. The model in Wang and Zhang (2015) is based on the standard model in the process flexibility literature. The method developed in this paper stems from semi-definite programming and stochastic process, both of which are widely used methodologies by the OM community.

Innovation. The innovation of Wang and Zhang (2015) mainly comes from the answers it offers to the question of interest, and the method it develops to get the answers. Prior to this paper, the effectiveness of the long chain structure has been theoretically and numerically examined with specific distributions. But this paper goes a giant leap further to develop an innovative semi-definite programming approach and obtain an analytic bound for *all* distributions with finite second-order moments. More importantly, this bound can be obtained with the information only regarding the first- and second- order moments of the demand distribution. Without this paper, we may not even know the existence of a distribution-free performance bound for the long-chain structure, let alone the simple yet profound closed-form characterization of this bound.

Clarity. I do not want to comment too much on the clarity of Wang and Zhang (2015) since it may be somehow subjective. For me, this paper is enjoyable to read. Its contributions are clearly articulated and positioned in the related works, so that its excellence with respect to the first four criteria is easily appreciated by a reader.

General guidance for PhD research. After discussing the publication criteria in the OM field, I would like to share some general guidance for PhD students in OM to self-train and improve their research capability. I summarize them into the following two categories: (a) to learn and practice how the five criteria are executed by other (more experienced) researchers, and (b) to learn to collaborate efficiently with your advisor(s) on research[1].

First, it is recommended you that keep reading papers published in top OM journals regularly, and try your best to understand how they have met the five publication criteria. The purpose of reading extensively is simple: You can gradually formulate an idea of what questions the OM community cares about, what answers the OM community finds interesting, what methods the OM community accepts and the other researchers use, what new stuffs the OM community expects a paper should bring us, and what writing can effectively communicate with other OM scholars. All in all, you must know what are considered to be good by the OM community, and why they are good. Your ultimate goal of reading papers extensively is to develop your own research taste, which is intrinsically imbedded into the taste of the whole research community, at both the macro (i.e., topics and methodologies) and micro (i.e., specific research questions, models, and solution tricks) levels.

Recall that research is a process of creating new knowledge, so you should also practice what you have learned with your own research projects. I suggest every PhD student starts working on research projects as early as possible. It takes time to transform what you have learned about the publication criteria into your own paper with publishable quality, especially when you are inexperienced in doing research. It is advised that, in your own research, you train yourself to ask different questions, try different approaches to address the questions, and make different "educated" guesses about the answers to your questions. Hopefully, such process could help you know which way will work and why. Recursively continuing the paper reading and practicing processes, you will find the right questions to ask, the right models/methods to use, the right guesses of answers, and the sweet spot of innovation that will be welcomed by the community. Getting stuck in a research project is quite common due to the nature of research, especially for inexperienced PhD students. Getting unstuck is, thus, a must-learn technique for any PhD student. I believe the best way to train your getting-unstuck skill is through the above reading and practice process so that you can develop and utilize your own research taste. Another related issue is the optimal stopping strategy for a research project that has the potential to go anywhere but a publication in a respectable journal. Again, you should train yourself to form your own research taste, and stop or spend less time on the project whenever you have a clear idea that it has little chance ending up with a good publication.

Writing is so important for an academic that good writing is good thinking visualized. A great research that well meets the first four criteria will end up with a poor paper if the clarity criterion is not met. So I highly recommend you spend a significant amount of effort improving your academic writing skill. Again, the approach is straightforward. You read the published papers and get a sense of good writing, and implement their writing strategies when writing your own paper. In doing research, it is possible either to start with a big picture and try to fill in the details, or to start with some key building blocks of the problem and try to form a big picture with them. In writing a paper, however, you should always start with a central message that you want to highlight, and reveal the necessary details afterwards.

So far, I have only discussed doing research at the individual level. Now I would like to share my thoughts on collaborating with advisor(s) and leading research projects from below. In the

[1] I focus on the case of collaborating with advisor(s), but the suggestions should apply to collaborating with other professors as well.

OM field, PhD students are *not* required to finish a single-authored job market paper[1]. Thus, it is generally the case that a PhD student collaborates with his/her advisor(s) on research projects. A critical issue faced by PhD students is how to work with advisor(s) efficiently? My general suggestion would be that, you should understand the short- and long- term objectives of your advisor(s) and try your best to align your interest with that of your advisor(s). The rationale for this suggestion is intuitive: If helping you could advance your advisor(s)'s career meaningfully, they will have more incentives to spend their time, effort, and resource on you. Otherwise, if your success at the PhD program has nothing to do with or even adversely influence his/her career objective, you should expect little help from your advisor(s). A PhD student is at the inferior side of the advisor-student relationship, so, to benefit from it most, you should put some thoughts to manage it[2].

For any particular research project you collaborate with your advisor(s), my advice is that you should try to reduce his/her time and effort on it. This seems paradoxical: You want your advisor(s) to spend more time on your project so that it will go faster and have a higher possibility of success. The rationale of my suggestion is clear if you realize the fact that your advisor(s) has tons of commitments (teaching, paper review, other research projects, administrative errands, etc.) and your project is only one (and probably not the most important one) of them. Keep in mind that time is the most important resource for a professor. The reason your advisor(s) would prioritize your project is that, it requires a small amount of time, which is his/her precious resource, but has the potential of a good publication, which is (probably the most) important for his/her career. Once your advisor(s) prioritizes your work, s/he will, ironically, spend a lot of time and effort working on it and promoting it in the community. A natural followup question would be: How can you reduce the time and effort of your advisor(s) on a project? The answer is actually quite simple: You increase your time and effort on it and you do more than you are asked to. You may do a complete literature review before your advisor(s) asks you; you polish your draft a few more times so that s/he only needs to spend 1 hour reading it instead of 10 without polishing; you may individually try different directions and get the result or the reason why it does not work, so that your advisor(s) can have a better idea of the project without even spending time thinking about the various possible directions, so on and so forth. In fact, taking the initiatives to do what is more than being asked has two other important advantages: (a) you can take the ownership of the research and find it more rewarding; and (b) you will get better trained as an independent researcher.

To conclude this subsection, I remark that the fact that the money of the OM academia mainly comes from revenues of educational programs (e.g., MBA, EMBA, specialized master's programs), and that an individual scholar's research is evaluated through the publication game and, more generally, the peer-review system is crucial in understanding the mechanism of the OM job market.

2.2 What will Candidates Get?

This subsection briefly summarizes what belief a rookie job market candidate should form about his/her life as a tenure-track Assistant Professor of Operations Management for the next couple of years. Once hired, you will be given 6-10 years (called the tenure clock) to produce publishable and, ideally, impactful research, teach undergraduate or graduate level courses, and perform internal and external services. If you do well in all aspects within this time-horizon,

[1] In Finance, Accounting, and Economics, writing at least one single-authored paper is required to get an academic job.

[2] See this blog post for more about the issue: `http://www.pgbovine.net/critical-path.htm`.

tenure will be awarded. Otherwise, you will have to find a new job as soon as the tenure clock finishes. Among others, your research output will be the main determinant of your tenure case. Therefore, you should expect that you will spend the majority of your time trying to produce original research (possibly in collaboration with other scholars) and have it published on top journals during the tenure clock.

The most fulfilling aspect of being a professor is that you will have the full flexibility and independence to pursue your intellectual vision and get the external credit via publications. Pushing the boundary of human knowledge never fails to fascinate me. The work style of a professor is entrepreneurial, i.e., you are your own boss, and will be fully responsible for your own career success and failure. An important corollary of the entrepreneurial work style is that time management is crucial to your success as an academic, especially at the junior (pre-tenure) level. Another attractive feature of being an OM professor in a business school is that you do not need to worry about applying for research grants from government, which is considered as the most challenging part of a professor in engineering or pure science fields[1]. OM research typically does not require expensive equipments. The business school will fund your PhD students and offer you the necessary research funds for conference travels. As an OM Assistant Professor in a business school, you will have no funding burden at all. A tenure-track Assistant Professor in OM will also enjoy the job security at least until the end of the tenure clock. The compensation is also quite good, compared with the jobs of equivalent seniority in industry. In the year 2013-2015, entry-level Assistant Professors are on average paid $142,525 for 9 months in a US public school, and $153,725 in a US private school[2]. You will also be additionally compensated during summer.

How about the downside of being an OM Assistant Professor? First, it is very demanding in terms of time, energy, and mentality. Since your work style is entrepreneur, you will need to handle tasks from multiple independent resources and, hence, multitasking is a must-learn skill for an academic. Your most important task, research, entails significant work with uncertain outcome. It is not uncommon that your paper takes years to get published after being rejected for a couple of times. Besides working intensively on your own research, you should also fulfill a couple other obligations in teaching and services (e.g., reviewing papers), which will eat up tons of your time. It is very easy for an academic to fill overworked (Actually, Assistant Professors are overworked!). Another downside of this job is that your research work may not have the direct and immediate impact upon practice. Most academic publications only have the value that they could potentially inspire other scholars' future research. This is a universal fact across all academic fields in this world, not just applicable to Operations Management. Of course, it is entirely possible that a research paper could benefit the business practice in the *long term*. If your goal is to immediately change the world, an Assistant Professor job in OM at a business school may be a disappointing starting point of your career.

3 A Model for the Operations Job Market

In this section, I will build a simple mathematical model for the academic job market in OM. This model is developed based on my personal experiences and observations of the OM job

[1] See this blog post for more about the issue: `http://www.pgbovine.net/simple-guide-to-research-grants.htm`.

[2] Data origin: Operations Academia (`http://www.operationsacademia.org/`), a website that publicizes information about job market candidates, job openings, confirmed placements of the operations academia. You may download the results of a survey conducted by Operations Academia via the following link: `http://students.olin.wustl.edu/~zhangr/Annual_Operations_Job_Market_Survey.pdf`.

market for the past three years. The main result of this section is a simple formula to capture the market value of a job market candidate. The main purpose of building this model is to help PhD students, who wish to find a tenure-track Assistant Professor in OM, to identify what they should work on in preparation for the job market throughout their PhD study.

3.1 What are the Schools Looking for?

In this subsection, I would like to explain what the schools are looking for on the OM job market, based on which we can build a model to capture the market mechanism. I will focus on the rookie (fresh PhD graduate) market. At the generic level, a school wants to hire a candidate with the following three potentials[1]: (a) the potential to be a liked colleague in the group, (b) the potential to do "good" research, and (c) the potential to be a "good" teacher. If you are hired, you will potentially stay in this group for the rest of your life. So the last thing a school wants to do is to hire someone that does not fit into the culture of the group, and disturb the collegiality therein. Doing "good" research means you should publish a certain number of high quality papers in top OM journals in the next couple of years. The research reputation of an OM group is, to a large extent, based on its faculty's publication volume and quality on the top journals. For different schools, the publication number, the quality of the publications, and the journal where your papers should be published vary considerably. As a rule of thumb, journals on the UT Dallas list[2] are widely considered as respectable ones in business schools. In the OM area, *Management Science*, *Operations Research*, *Manufacturing & Service Operations Management*, *Production and Operations Management*, and *Journal of Operations Management* are included in this list. For a job market candidate, his/her research potential will also be evaluated by his potential to publish papers in these journals. I will get back to this point later when introducing the model of the OM job market. As commented on earlier, the educational programs are a main revenue source for a business school, so teaching is another indispensable part of a professor's obligation. In most situations, a junior professor in a business school needs to teach 3 - 6 courses each year[3]. Being a "good" teacher means that you can get a sufficiently high teaching evaluation from the students for each course you teach, i.e., you make your students feel happy about your class.

In addition to the standard expectations of a good colleague, a good researcher, and a good teacher, a school on the market usually has some specific needs for its opening. In general, there are three kinds of needs: (a) they want someone to teach some specific courses, (b) they need someone to do some specific research, and (c) they just want to expand their group. A lot of recent OM openings arise from the fact that a business school initiated a Business Analytics program so that they need a new faculty member who could contribute to this program by teaching data analytics, statistics and the related stuffs. In other situations, a schools hires because a professor left or retired, and, hence, they need someone to take up the courses s/he taught. It is also possible that the school wants to find a candidate that can strengthen their research in a certain area. Finally, the school may just try to hire some people to expand the OM group, without any specific teaching or research needs.

In summary, what the hiring schools care about are the (potential) personality fit, research strength and fit, and teaching strength and fit. It would be very much helpful for a job market candidate to have an idea of the employers' needs both at the macro market and the micro institution level.

[1] Different schools may weigh these potentials differently.

[2] See `http://jindal.utdallas.edu/the-utd-top-100-business-school-research-rankings/`.

[3] The number of courses you need to teach, again, depends on the university you work for.

3.2 Model

This subsection develops a model to illustrate how the competitiveness of each job market candidate is influenced by different attributes. For simplicity, we only consider the OM job market of a specific academic year (say 2015-2016). Assume that we have m candidates and n schools[4] on the market. In recent years, m and n are around the magnitude of 100-130. Denote $\mathcal{M} := \{1, 2, \cdots, m\}$ as the set of all candidates on the market and $\mathcal{N} := \{1, 2, \cdots, n\}$ as the set of schools that have an opening. Let $\mathcal{G}$ be an bipartite graph that connects $\mathcal{M}$ and $\mathcal{N}$. For any $i \in \mathcal{M}$ and $j \in \mathcal{N}$, the edge $(i, j) \in \mathcal{G}$ if and only if candidate i applies to school j.

For any $(i, j) \in \mathcal{G}$, the competitive advantage of candidate i at school j, $CA_{i,j}$, is given by the following equation:

$$CA_{i,j} = X_{i,j}Y_{i,j}Z_i(\alpha_j R_i + (1 - \alpha_j)T_i)\xi_{i,j}, \tag{1}$$

where

- [1]$X_{i,j}$ measures how candidate i fits the **Need** of school j. Specifically, $X_{i,j} = I_{i,j}F_{i,j}(r_{i,j} + t_{i,j})(B_{i,j} + D_{i,j})$. Here, $I_{i,j} \geq 0$ is the interest of candidate i towards school j. $I_{i,j}$ is larger if candidate i is more enthusiastic about school j. In general, $I_{i,j}$ is inferred by the interactions between candidate i and school j during the interview process. However, a lower-tier school may think you are not sincere about their position if you graduate from a top-tier PhD program with a good research record. In this case, $I_{i,j}$ would be low. $F_{i,j} \in [0, 1]$ is the personality fit between candidate i and school j, which measures to what degree candidate i could fit into the culture of school j and become a good colleague therein. $F_{i,j}$ is higher if candidate i fits school j better in terms of personality and culture. $r_{i,j} \in [0, 1]$ and $t_{i,j} \in [0, 1]$ capture to what extent candidate i can potentially satisfy school j's research and teaching needs, respectively. If s/he has the potential to well meet the research (teaching) need or the school has no specific research (teaching) need, $r_{i,j}$ ($t_{i,j}$) is close to 1. Otherwise, candidate is not likely to satisfy school j's research (teaching) need well, $r_{i,j}$ ($t_{i,j}$) is close to 0. $B_{i,j} \geq 0$ is the value of candidate i's PhD-granting institution brand to school j. It is not necessarily the case that $B_{i,j}$ is larger if candidate i's PhD institution is a higher-ranking school. Instead, each school j has a set of schools that they feel comfortable to hire a candidate graduating from this set. If candidate i is not from school j's comfortable school set, $B_{i,j} \sim o(1)$. $D_{i,j} = E_{i,j} + G_i$ measures the diversity need of school j, where $E_{i,j} \geq 0$ refers the ethnic need and $G_i \geq 0$ refers to the gender need. Different schools care differently about ethnic background, so $E_{i,j}$ is dependent on j (very significantly). Moreover, at a specific school j, the value of $E_{i,j}$ could be *significantly different* for different candidate i. G_i is the gender of candidate i. $G_i = 0$ ($G_i = 1$) if candidate i is male (female).

- $Y_{i,j}$ measures the strength of **Connection** between candidate i and school j. $Y_{i,j} \geq 0$. Ignoring the extreme cases of super stars on the market, a rookie candidate's academic connection is negligible, so $Y_{i,j}$ more or less summarizes the connection between candidate i's advisor(s) and school j and how well the advisor(s) leverage this connection. For the usual case, $Y_{i,j}$ is normalized to 1. If candidate i's advisor/letter writer/PhD program has a good friend that is in power at school j and this connection is well utilized, $Y_{i,j} >> 1$.

[4]Different programs in the same school are counted as two schools since their recruiting decisions are independently made.

[1]I make the definition of the need attribute $X_{i,j}$ more specific based on the suggestions of Xin Geng and Cathy Raymond.

It's clear that need and connection attributes are also dependent on the school and, thus, not fully under control by a candidate. In the next two sections, I will discuss how a candidate can leverage these two attributes at the pre- market stage and during the job market season.

- Z_i measures the strength of candidate i's *verbal* **Communication** strength. $Z_i \geq 0$ and is normalized to 1 for a candidate with average communication skills. For a great communicator, $Z_i >> 1$; for a poor communicator, $Z_i \sim o(1)$. I cannot overemphasize the importance of being a good communicator for a job market candidate. Not only because the majority of the tasks a professor has to deal with are to communicate (writing papers, teaching students, presenting at conferences and seminars, discussing with other researchers, etc.), but also because the whole faculty recruiting process is filled with verbal communications between you and the school (conference interviews, campus interviews, job talks). Through these communications, you will need to convince the recruiting committee that you will become a good colleague, a good researcher, and a good teacher.

- $\alpha_j \in (0, 1)$ captures the **Type** of school j, i.e., how much emphasis school j puts on research relative to teaching. An academic is supposed to be a researcher and a teacher, but a school may be either research-oriented or teaching-oriented. If school j is a research oriented school (also called a research school), α_j should be closer to 1, otherwise, it is called a teaching school and α_j should be closer to 0. It is advised to use school j's teaching load to infer its school type[1]. If school j's usual teaching load is 3 courses per year for a tenure track OM Assistant Professor, it is a research school and α_j should be higher than 0.75. If the teaching load is 4 courses per year, it is a balanced school and $\alpha_j \in [0.25, 0.75]$. If the teaching load is greater than 4 courses per year, school j is a teaching school and α_j is lower than 0.25.

- R_i measures candidate i's **Research** strength. Specifically, $R_i = (S_i + A_i)P_i$, where $S_i > 0$ measures the reputation of candidate i's PhD program, $A_i > 0$ measures the reputation of candidate i's advisor(s), and $P_i > 0$ measures the strength of candidate i's papers/publications. The key determinant of S_i is the number of well respected scholars that graduated from candidate i's PhD program and the recent placements of this program. Analogously, the key determinant of A_i is the number of well respected scholars that were advised by candidate i's advisor(s) and the placements of this professor's recent PhD students. A_i will also be largely influenced by candidate i's advisor(s)'s assessment about this candidate in the reference letter, especially if the advisor(s) has multiple students on the market in the same year. P_i is determined by candidate i's paper and publication record. As of 2016, it is *not necessary* to have publications to find a good job in the OM market. In order to graduate from a PhD program, you need at least 2 to 3 working papers that are targeted towards publications in respectable journals. We could normalize P_i to 1 if candidate i is of this baseline case. P_i will be higher if some of the following hold:

  - Candidate i has a good job market paper[2]. In most cases, the job market paper is the only research work a candidate could show (in a job talk seminar) to a school with sufficient details. In some sense, the job talk is the only opportunity the candidate has to introduce what s/he is actually working on to the school.

[1] This only applies to business schools, but not to IEOR departments.

[2] For areas like Finance and Accounting, a job market candidate is required to finish a single-authored job market paper. The job market paper in these areas is extremely important, if not the only indicator for a candidate's research potential.

  - Candidate i has publications in top OM journals[3]. At least in the 2015-2016 OM rookie market, publications in journals on the UT Dallas list are considered as an important indicator of a candidate's research potential.
  - Candidate i's research is marketable (i.e., the research topic and/or method are "hot").
  - Candidate i has strong pipeline works that are potentially publishable in top OM journals (submitted or, even better, passed the first-round review).
  - Candidate i has won some student paper competition awards.

- T_i measures candidate i's **Teaching** strength. In general, a PhD graduate should at least have done a few TA works as a grader. We normalize T_i to 1 for this benchmark case. If candidate i has done some recitations, guest lectures, review sessions, etc., T_i will be slightly higher than 1. If candidate i has been an instructor for a related course with a good evaluation[1], T_i will be significantly higher than 1. In particular, T_i is concavely (but strictly) increasing in the number of courses candidate i has taught with good evaluations. A lot of schools also use a candidate's job talk performance to infer his/her teaching potential. Our model captures this effect in the communication term Z_i.

- $\xi_{i,j}$ is the **Randomness** between candidate i and school j not directly captured by the model. $\xi_{i,j} \geq 0$ are independently distributed across all $i \in \mathcal{M}$ and $j \in \mathcal{N}$ with $\mathbb{E}[\xi_{i,j}] = 1$.

Let $Q_{i,j} := \alpha_j R_i + (1 - \alpha_j) T_i$ denote the **Qualification** of candidate i in school j. Thus, $Q_{i,j}$ measures the qualification of candidate i to perform research and teaching in school j. We have, for any candidate $i \in \mathcal{M}$ and $j \in \mathcal{N}$,

$$\begin{aligned} CA_{i,j} =& X_{i,j} Y_{i,j} Z_i Q_{i,j} \xi_{i,j}, \\ \text{where } X_{i,j} =& I_{i,j} F_{i,j} (r_{i,j} + t_{i,j})(B_{i,j} + D_{i,j}), \\ Q_{i,j} =& (\alpha_j R_i + (1 - \alpha_j) T_i), \\ D_{i,j} =& E_{i,j} + G_i, \\ R_i =& (S_i + A_i) P_i. \end{aligned} \tag{2}$$

I remark that, for any $i \in \mathcal{M}$ and $j \in \mathcal{N}$, the variables in the competitive advantage formulas, (**??**) and (**??**), $X_{i,j}$, $Y_{i,j}$, Z_i, $Q_{i,j}$, and $\xi_{i,j}$ are very difficult, if not impossible, to quantify and estimate in practice. Therefore, the purpose of building this model is not to calibrate these parameters and predict the outcome of the OM job market. Instead, my objective is to demonstrate the mechanism of the job market qualitatively, and offer insights for PhD students to prepare for the job market.

Given the competitive advantage formula (**??**), each school j's recruiting actions are straightforward to model. Assume that school j has o_j openings[2]. School j will make offers to the o_j candidates with the highest competitive advantage $CA_{i,j}$ such that $(i, j) \in \mathcal{G}$. If school j's top choice(s) does not accept the offer, it is possible that the school will make an offer to a qualified candidate ranked lower than their top choices[3].

[4]In addition to the competitive advantage of a candidate at each school, we are also interested in his/her overall market value. The exact market value of candidate i is difficult to define and

[3]Accepted papers are considered as publications on the OM job market.

[1]In order for the teaching experience to count, the instructing language should be English.

[2]Usually, $o_j = 1, 2$. In some rare cases, o_j may be up to 5.

[3]Some schools will choose not to hire anyone and carry the opening over to the next year.

[4]The new market value model is inspired by Xin Geng's suggestion.

compute due to the complex structure of the job market. I use the following approximation scheme to determine each candidate's market value. The market value of candidate i, MV_i, is given by:

$$MV_i = \sum_{(i,j)\in\mathcal{G}} \left(\frac{1}{2}\right)^{(\gamma_{i,j}-1)}, \tag{3}$$

where $\gamma_{i,j}$ is the ranking of $\mathbb{E}[CA_{i,j}] = X_{i,j}Y_{i,j}Z_iQ_{i,j}$ among all candidates that apply to school j. That is, if candidate i has the highest (second highest, third highest) expected competitive advantage among all candidates that apply to school j, s/he will get a score of 1 (0.5, 0.25) from school j. Candidate i's market value MV_i is the sum of his/her scores from the schools s/he applies to. Candidate i's objective before going onto the job market is, therefore, to maximize the market value MV_i subject to his/her time constraint.

To conclude this section, I would like to discuss three immediate implications[1] of our formulas about competitive advantage (**??**), and market value (**??**): overwhelming uncertainties, bottleneck effect, and winner-take-all.

Overwhelming uncertainties. The first observation is that, too much of the job market is out of control for a candidate. The need $X_{i,j}$, the connection $Y_{i,j}$, and the school type/research-teaching weight α_j all heavily depend on some characteristics of the schools, whereas the randomness term $\xi_{i,j}$ is completely beyond the candidate i's control. Although PhD students put the majority of the time and effort on research papers, the research outputs P_i may only count a little fraction towards his/her job market success or failure. Such uncertainties and loss of control contribute significantly to a candidate's anxiety when staying on the market.

Bottleneck effect. As shown in (**??**), candidate i's competitive advantage at school j, $CA_{i,j}$, depends on four main attributes in a multiplicative manner: need, $X_{i,j}$, connection, $Y_{i,j}$, communication Z_i, and qualification, $Q_{i,j}$. We call them the **fundamental attributes** of an OM job market candidate i at school j. The multiplicative structure implies the bottle neck effect of a candidate's competitiveness on the market: Candidate i's competitive advantage at school j is very much limited by his/her weakest fundamental attribute. Therefore, working on improving the weakest attribute is the most effective way for a job market candidate to enhance his/her competitiveness on the OM job market.

Winner-take-all. Last but not least, from the schools' offer-making rule and the market value formula (**??**), what really matters for each candidate i is how many schools s/he can rank *top* among its candidate pool, instead of how many schools s/he can rank *good*. Note that candidates on the market apply to very similar set of schools. So candidate i dominates candidate i' at school j, it is very likely that candidate i also dominates candidate i' at other schools they both apply to and, thus, their market values, MV_i and $MV_{i'}$, will be drastically different even if candidate i is just slightly better than candidate i'. Therefore, candidates should be aware that the OM job market somehow has the feature of winner-take-all.

4 Model Implications: Pre- Job Market Stage

The focus of this and the next sections is to offer some advice for PhD students to prepare for the OM job market based on the model developed in Section **??**. I will discuss the implications

[1] In fact, the logic is the other way around here. I have observed these implications in practice first, and developed formulas (**??**) and (**??**) that could have these implications as natural consequences.

for the pre- job market stage (from the beginning of the PhD study till going onto the job market) in this section and those for the job market season in the next section. Our discussions in this section will mainly be based on the competitive advantage formula (**??**) and the market value formula (**??**).

I have three main pieces of advice for PhD students to prepare for the OM job market at the pre- market stage:

- **Placement dominates all.** If your goal of pursuing PhD is to get a good job in the operations academia[1], you should choose the PhD program and the advisor(s) (almost solely) based on their placement record.
- [2]**Be aware of your target.** You should have a clear idea about what are your target schools.
- **Be an early-bird.** You should start early and make plans to prepare for the job market.

When it comes to the decisions of which PhD program to go to and which advisor(s) to work with, there seem to be a great many of factors to consider, such as location, research interest, personality fit, etc. To make these complex decisions tractable, I propose that, if your objective is to find a good job in the OM academia, it is a good idea to solely make the decisions based on the placement records. From (**??**) and (**??**) we know that there are so many implicit factors that will determine a candidate's market value, a lot of which are simply invisible to PhD students when they need to make program and advisor selection decisions (e.g., the connection of a professor). It is clear that the program and the advisor(s) will have very huge impact upon the need attribute $X_{i,j}$, the connection attribute $Y_{i,j}$, and the qualification attribute $Q_{i,j}$ of candidate i. If a program or an advisor consistently place their students to good schools, by the bottleneck effect of the multiplicative structure (see equation (**??**)), they must have done well in all the fundamental attributes they could contribute to. That is, they have the vision and resource to train and advise their students to work on "trendy" research topics (i.e., enhancing $r_{i,j}$ and, thus, $X_{i,j}$), they have good connections in the OM community and well utilize the connections to help their students on the job market (i.e., enhancing $Y_{i,j}$), they are well reputed in terms of training great scholars in our field (i.e., enhancing S_i and/or A_i), and they can train their students to do first-class research, and publish papers in top journals (i.e., enhancing P_i). The information of all these desirable features of a PhD program and an advisor is almost completely summarized (with some noise) by their placement records. To have a more accurate understanding of the placement record, it is advised that you put more weight on the recent placements of the students with a similar ethnic and gender background to you (i.e., to rule out the noises from $E_{i,j}$ and G_i).

From (**??**), we know that it is important to make yourself at the top of the list for some schools (i.e., getting the *highest* $\mathbb{E}[CA_{i,j}]$). For the same candidate but different schools, $B_{i,j}$ (brand value), $E_{i,j}$ (ethnic background), $Y_{i,j}$ (connection) and α_j (school type) could be dramatically different. Thus, it is advised that a candidate i should have a clear idea about his/her "actual"[3] target schools a priori, so that s/he could have a better chance to rank top on these target schools. It will be great if candidate i could know, for which school j, s/he can achieve high $B_{i,j}$, $E_{i,j}$ and $Y_{i,j}$, all of which are (almost) completely out of his/her control. Such school

[1]If not, you may value other stuffs in the process of the PhD experience. In this case, your choice may not necessarily be placement-oriented. I thank Meng Li for pointing this out.

[2]This advice is inspired by the comments of Xin Geng.

[3]As I will discuss later, candidates should apply broadly. But his/her target school may not necessarily be that broad.

j will be a good choice for candidate i's the target schools. Moreover, since the qualification attribute $Q_{i,j} = \alpha_j R_i + (1 - \alpha_j)T_i$, the value of α_j undoubtedly has great bearing on how candidate i should allocate his/her time wisely between R_i and T_i. In other words, it is advised for a PhD student to have a clear idea about his/her target school category early in the PhD program. Research schools? Balanced schools? Or teaching schools? If the target is a research school, you should focus on building up your research profile (papers and publications) without too much worrying about teaching. If the target is a teaching school, you should focus on building up your teaching experience (as an instructor) but not on pushing out papers in top OM journals. If the target is a balanced school, you should find a sweet spot between these two extremes. The essential factors to determine your target school type are (a) your personal interests (You prefer research or teaching?), (b) your preferred life style (Professors at research schools have much higher pressure to get tenure (and get paid much higher as well) than those in teaching schools.), (c) your resource (Is your advisor actively publishing papers in top OM journals? Does the PhD program offer independent teaching opportunity?).

The four fundamental attributes of a job market candidate i (need $X_{i,j}$, connection $Y_{i,j}$, communication Z_i, and qualification $Q_{i,j}$) all take years to develop, and the development process involve a huge level of uncertainty. Therefore, it is strongly encouraged that a PhD student who wishes to pursue an academic career in Operations Management should start preparing for their job market as early as possible in the PhD program. For the rest of this section, I will discuss the pre- market preparation strategies to improve each of the four fundamental attributes.

4.1 Need $X_{i,j}$

Recall that $X_{i,j} = I_{i,j}F_{i,j}(r_{i,j} + t_{i,j})(B_{i,j} + D_{i,j})$. At the pre-market stage, the controllable factors are $F_{i,j}$, $r_{i,j}$ and $t_{i,j}$.

- **Personality fit $F_{i,j}$.** Different schools may have different cultures and welcome different personalities. However, every school likes a candidate who is a positive, sincere, trustworthy, and warmhearted. Therefore, I would suggest you try to be such a *person* in the first place, which will not only benefit your job market performance, but also your whole career.

- **Research need $r_{i,j}$.** To improve your research fit to potential employers, it would also be helpful to work on trendy research. A corollary of this advice is that when selecting the advisor(s), a PhD student may prioritize a professor that does more trendy research. Sometimes, you know what are trendy and popular on the market, but your advisor/program/school does not have the resource for you to pursue these cool stuffs. In this situation, you just try to identify what is outdated and nobody cares about, and avoid working on such stuffs. As of 2016, candidates who do data related research are very welcomed by the OM job market.

- **Teaching need $t_{i,j}$.** To meet the potential teaching need, you may try to teach and/or TA trendy courses whenever there is an opportunity. The good news is, since schools need to offer courses that are attractive to current students, it is unlikely that you will have the opportunity to teach an outdated course. As of 2016, candidates who can teach data related courses are very popular in the OM job market.

4.2 Connection $Y_{i,j}$

Frankly speaking, besides choosing a program and advisor(s) with good connections, there is little leverage for a PhD student to improve the connection attribute. Connection is a bilateral relationship that requires time and effort, but it is difficult for a PhD student to justify that you are worth a senior professor's time connecting with you. Therefore, try your best but do not expect too much out of your effort spent on building connections during your PhD study. I would suggest PhD students to go to academic conferences and talk to different people therein as early as possible. Doing this may or may not contribute to your job market performance, but it will definitely benefit your future career in the long run. You will anyway need to connect with the same set of people after you graduate and become a professor. Thus, view the efforts to build academic connections during your PhD study as a long term investment.

4.3 Communication Z_i

Compared to the need and connection attributes, the communication attribute is more controllable by a PhD student. I want to emphasize again that, in order to excel on the OM job market, you have to be a great communicator to convince schools that you have the potential to become a good colleague, a good researcher, and a good teacher. You need to train yourself to become a great communicator through continuous practices, both in casual small talks and in formal seminar presentations/teaching/public speaking. To improve the communication skill in small talks, it is advised that you regularly attend some social events (including the ones during conferences) to practice talking with others. You should also learn from the great small-talkers. Your school may also offer some communication classes that you can take. Your objective should be that, after years of practices, any stranger that speaks with you would find you a delightful person to talk with. For presentation skills, I would recommend you take as many opportunities as possible to present in classes, seminars, and conferences. You can also learn some presentation skills by taking presentation classes and/or watching videos of great presentations in, e.g., YouTube or TED Talks. Your objective of the year-long presentation skill practice is that your presentation will be clear, engaging, technically solid, and broadly appealing to the audience not familiar with your work or even your area of study.

4.4 Qualification $Q_{i,j}$

Qualification is probably the most controllable attribute for a PhD student. After pre-selecting a set of target schools, a candidate i should try to improve his/her research qualification R_i and/or teaching qualification T_i accordingly. Below, I discuss research and teaching separately.

4.4.1 Research R_i

Once the PhD program and the advisor(s) are settled, a PhD student has no control over S_i and A_i. Hence, my advice will focus on improving P_i. The main research advice for PhD students is already given in Section **??**, so I will not repeat them here. I just want to emphasize that you should start doing research as soon as possible, since the review cycle of OM journals is in general quite long (on average, 2 years from submission to acceptance) and the acceptance rate of a top journal is quite low (about 10%)[1]. Another important reason for starting early

[1]The long review cycle and the low acceptance rate apply to all areas in a business school.

is that, you will have enough time to hedge against the mistakes or bad lucks of your first project, which generally goes slow due to your inexperience in research. At the advanced stage of your PhD study, it is often the case that you work on multiple research projects. Thus, you face the classic multi-armed bandit (MAB) problem of allocating your time among these projects/papers. I would recommend a rule-of-thumb for PhD students in this situation: You should prioritize the paper that is closest to acceptance[2]. In most cases[3][4], schools view papers that have been accepted or under minor revision at a top journal as a much stronger positive signal of a candidate's research potential, compared with the working papers that are either just submitted or only going through one round of review.

4.4.2 Teaching T_i

To conclude this section, let's talk about teaching. As I have discussed earlier in Section **??**, if a candidate has not taught as an independent instructor, his/her teaching qualification T_i will (almost) not be influenced by his/her teaching record. This implies that, if your school does not offer you the opportunity to independently teach a course, you cannot improve your teaching qualification by doing extensive TA works. In particular, if you target a teaching (or even a balanced) school but your PhD program does not allow you to teach, you *have to* find some independent teaching opportunities in other institutions[1][2]. If you have the plan of seeking for some outside opportunities, do start early. It takes time to find such opportunities, and the courses are generally assigned and scheduled 3-6 months before they actually start. Whenever you have a teaching opportunity, try your best to teach well. A bad evaluation is worse than no teaching experience at all. If you are solely targeting a research school, independent teaching experience is not important (but still helpful) for your job market success. In this case, you may not want to spend huge effort on finding outside teaching opportunities, which could negatively impact your research productivity.

5 Model Implications: Job Market Stage

The goal of this section is to offer executable suggestions for the candidates in the job market season based on the model developed in Section **??**. I will start with some general suggestions, followed by some detailed suggestions at each stage of the job market season.

My main pieces of advice for candidates in the job market season are that:

- **Apply broadly.** You should apply to each school that you want to go to.
- **Address schools' needs.** You should understand the schools' needs and position yourself accordingly.

[2]Please do not use this rule if one of your papers will *definitely* have enormous impact upon the OM community. In this case, feel free to work on this great paper.

[3]The exceptions are: (a) Your paper is historically marvelous; or (b) You are from a top school.

[4]In areas that require a single-authored job market paper (i.e., Economics, Finance, and Accounting), you priority should absolutely be given to your job market paper.

[1]For the OM job market in 2016, it seems to me that independent teaching experience is *required* for jobs at teaching or balanced schools.

[2]You may directly contact the program director of another school or use your advisor's personal connection to find such opportunities.

- **Rehearse your talks.** You should practice your job talks and interviews and have them polished.

When you are already on the market, there aren't many things on which you still have the leverage. In particular, for all of the four fundamental attributes (need $X_{i,j}$, connection $Y_{i,j}$, communication Z_i, and qualification $Q_{i,j}$), you can no longer improve them substantially, but could still more or less enhance some of them with the three strategies above.

The first suggestion is to apply broadly. The general rule-of-thumb is that you should apply to any school that you will be willing to go to if it is the only one that makes you an offer. Because of the huge uncertainties on the academic job market, it is not a good idea to put all your eggs in one basket. Moreover, by the formula for a candidate i's market value (**??**), the more schools you apply to, the higher market value you will have (Anyway you will have more chances if applying to more schools.).

Even when you are on the job market, there is still some room to improve the need attribute, $X_{i,j}$, by understanding the schools' needs and present your experiences and expertise in a way that can best fulfill their needs. Just like any other job market, employers on the OM market are not sure whether the candidates could meet their specific need(s). Thus, the candidate that could put themselves in the schools' shoes will better reduce such uncertainty and have a better chance of getting the job. That is, your goal is to increase the value, and decrease the uncertainty of $r_{i,j}$ and $t_{i,j}$ for each school j. I will postpone the detailed discussions on how a candidate should address the schools' needs at the institution and individual professor levels later, when we come to the specific preparation strategies at different stages of the job market.

The other fundamental attribute you still have some control over during the job market season is communication Z_i. You have practiced your communication skills for four years, and this is a good time to exploit them. The basic idea is quite simple: You have everything you will possibly say during the job market season well prepared. You rehearse and polish your job talk. You also anticipate the possible questions during both the interviews and the job talk, prepare for the answers, and practice the answers well in advance. The preparation strategies at different stages of the job market will be elaborated later.

I would like to use myself as an example to introduce different stages of the OM job market, and provide actionable suggestions for a job market candidate at each stage. The OM job market consists of four main stages: (a) Application, (b) Conference Interviews[1], (c) Campus Interviews (Fly-outs), and (c) Decisions. I will walk the readers through this challenging yet rewarding process. Here we go!

5.1 Application

The 2015-2016 OM job market started with the release of the first recruiting advertisement by Kellogg School of Management, Northwestern University, on July 8, 2015. Schools (around the world) gradually advertised their openings through one of the following five media: (a) the Operations Academia Job Postings[2], (b) the INFORMS Career Center[3], (c) the MSOM email list, (d) the POMS Placement[4], and (e) the DSI Placement[5]. It is advised that you browse

[1]Some schools do not have the conference interview stage. They may have a skype/phone interview, or directly invite top candidates for fly-outs.

[2]`http://www.operationsacademia.org/job-postings`

[3]`http://careercenter.informs.org/home/`

[4]`http://www.poms.org/placement/`

[5]`http://www.decisionsciences.org/Become-a-Member/Placement/Position-Listing`

through all these job lists since each of them has some job postings that only exist in it. To decide which schools to apply to, my suggestion is, as stated earlier, apply broadly to any school that you will go if it is the only school that makes you an offer. For my own case, I chose all the schools with the location that my wife and myself found reasonably happy to live in. Eventually, I applied to 99 schools (93 business schools, 2 hotel schools, and 4 engineering schools) out of about 130 openings on the market[6]. Although I was targeting research schools, I still applied to more than 50 teaching schools, since it did not hurt to apply anyway[7].

The most important advice I have for a (non-stellar) job market candidate at the application stage is that you should submit your application before the early deadline for the conference interviews. At least, you should submit your CV prior to that date so that you will be considered for a conference interview opportunity. Recall that there are more than 100 candidates competing for one tenure-track Assistant Professor position. Any opportunity to increase your visibility to and interactions with the schools is, thus, very valuable and should be taken seriously.

A complete application package consists of the following documents: (a) a cover letter, (b) your up-to-date Curriculum Vitae, (c) a research statement, (d) a teaching statement, (e) sample research papers, (f) teaching evaluations, and (g) reference letters. A particular school will only request a subset of these documents, with your CV and reference letters definitely included. Your CV and reference letters are the most important parts of your application package, but they are almost non-controllable at the job application stage. Therefore, the bottom line is that you should avoid spending too much time preparing these documents, so that you can meet the conference interview deadlines. But you should also avoid obvious typos and/or grammatical mistakes. Below are some suggestions on preparation strategies:

- *Cover letter*[1]. It is advised that, at least for your main target schools, you should customize your cover letter to address their specific needs and/or highlight the names of the professors with whom you could work with in the future.
- *Curriculum Vitae*[2]. It is very likely that your CV is the only document in your application the recruiting committee will read. So make sure it is professional and informative. It should be a detailed summary of your experiences, achievements, and qualifications that you think the recruiting committee would find useful for them. I included the following sections in my CV at the time on the market, listed in order: Contact Information, Education, Employment, Research Interests, Publications, Working Papers, Works in Progress, Conference Talks, Teaching Interests, Teaching Experiences, Professional Services, Consulting Projects, Selected Honors, Technical Skills, Personal, and References.
- *Research Statement*[3]. Your research statement should include a coherent summary of your research contributions and a brief description of your future research agenda. For me, writing the research statement gives me a great excuse to think about the current market needs for research, my past research, future research plan, and how PhD research transitions to future agenda, which is of great help for me to prepare for the conference and campus interviews.

[6] I may apply too broadly. As a breadwinner of my family, I am a little bit risk averse.

[7] There is no monetary cost to apply for a faculty position.

[1] Here you can find a sample cover letter (for the Computer Science academic job market) by Matt Welsh: `http://www.eecs.harvard.edu/~mdw/private/jobapp/harvard.pdf`.

[2] Here you can find my CV when I was on the market: `http://students.olin.wustl.edu/~zhangr/CV-Philip-Zhang-JobMarket.pdf`.

[3] Here you can find a sample research statement (for the Computer Science academic job market) by Matt Welsh: `http://www.eecs.harvard.edu/~mdw/private/jobapp/research.pdf`.

- *Teaching Statement*[4]*.* Your teaching statement is the teaching counterpart of your research statement. You should introduce your teaching experience and relate it to your teaching philosophy/method. You should also describe explicitly what courses you want to teach in the future. For me, my teaching experience was nothing beyond grading and giving review sessions for an MBA Operations Management course. So I used a different approach to directly describe my teaching philosophy and method in my future teaching. I would like to mention that, for a teaching school, the teaching statement is an important application material, and the recruiting committee will read it pretty carefully if you pass the initial screening. However, if you are targeting a research school, I suspect your teaching statement will not necessarily be read at all.

- *Research papers.* Some schools request you to send a few sample research papers including your job market paper. You just send your best works and/or the papers that match their research interests/needs most. Do not worry about the job market paper, you can change it whenever you want.

- *Teaching evaluations.* If you ever have a teaching evaluation (as a TA or an instructor) and the evaluation is *good*, send it to the recruiting committee to demonstrate your teaching credential. I did not have any teaching evaluation when I was to submit the applications. Hence, I submitted a short letter listing my previous TA experiences and the contact information of the professors I had helped as a TA as an alternative.

- *Reference letters.* You need two to four reference letters. Obviously, your advisor(s) should write one for you. The rest of the letters should come from some professor(s) that will say something positive about you (ideally, from someone well known in the OM field). Unfortunately (or fortunately), the letter strength is totally out of your control, so you need to do nothing but make sure every letter will arrive reasonably early (at least before the final deadline). Reference letters are the second most important application materials (next to CV), especially when deciding the shortlisted candidates for fly-outs. I will get back to this point later.

I started to prepare the application materials in mid-July 2015, and finished polishing my research and teaching statements in mid-September. I sent out the applications and contacted my letter writers from mid-September to mid-October[1]. The INFORMS 2015 Annual Meeting, where most schools did the conference interviews, was held on November 1-4, 2015 in Philadelphia. So most schools set the early deadline for conference interviews in mid- or late- October, 2015. As a final note for the application stage, I recommend you have a personal website and post your Job Market Profile in Operations Academia[2], both of which can (marginally) increase your visibility on the market. It is also advised that you can try to submit your papers to various student paper competitions. If you are lucky to win an award, it can improve your research qualification R_i.

5.2 Conference Interviews

After submitting all applications, I moved into the conference and campus interview stages. I will talk about the conference interview stage in this section, and the campus interview stage in

[4]Here you can find a sample teaching statement (for the Computer Science academic job market) by Matt Welsh: `http://www.eecs.harvard.edu/~mdw/private/jobapp/teaching.pdf`.

[1]I still occasionally sent out applications afterwards when new jobs were posted.

[2]`http://www.operationsacademia.org/candidates`

Section **??**. Candidates have tons of verbal communications with the schools at the interview stages. Therefore, the main advice I have for job market candidates is that you should try your best to engage the professors with your research, your teaching, and, most importantly, yourself[3]. Just keep in mind that they want to hire a likable colleague that has the potential to fulfill their research and teaching needs. So your job is to convince them (with effective verbal communications), in a relatively short period of time, that you will become such a colleague. As a general rule of thumb, whenever you speak to someone, keep smiling, have appropriate eye contact, and stay enthusiastic.

After receiving hundreds of applications, schools selected a subset of candidates for conference interviews during the INFORMS Annual Meeting (November 1-4, 2015) or the DSI Annual Meeting (November 21-24, 2015). The purpose of the conference interviews is that, before making a greater commitment of fly-out invitations, the schools want to see the candidates in person, know more about their research and teaching, and, hopefully, have a better guess of whether they will become good colleagues.

Schools did an initial screening of the applications and invited about 20-30 candidates for interviews in one of the two conferences[1]. Starting from mid-October 2015, I received dozens of invitations for conference interviews at INFORMS or DSI[2]. The conference interviews were casual in nature and the interviewers were extremely friendly. For each interview I had at INFORMS or DSI, I met 1-5 professors from the hiring school for 20-30 mins to discuss about my research and teaching. The professors may also briefly talk about their schools and/or programs. Quite a few professors that interviewed me at INFORMS also attended my conference talks. Thus, it is important to have a good preparation for your conference talk when you are on the job market.

The most important strategy to prepare for the conference interviews is to have everything well-practiced based on the needs of the schools. Specifically, the conference interview questions are quite standard and more or less the same for all schools. The schools are essentially asking three questions: (a) What is your current research? (b) What is your future research agenda? And (c) what is your teaching experience and interest? Hence, your job is to write and polish the answers to these questions, memorize the answers, and practice the answers for multiple times before the conference. For the first question, it is suggested that you prepare a 3-min pitch of your overall research, and a brief description for each of your papers listed on your CV. The answers to all these questions should be concise and clear. For the brief description of your specific paper, it is suggested that you begin with something concrete and simple to motivate your listeners who have already been very tired to interview the 10th candidate on that day. When you have the answers to these questions ready, try to practice with your family, friends, and classmates to make sure that your answers could effectively communicate your ideas. I did mock conference interviews with a couple of friends who were on the OM job market last year (2014-2015), and received quite a few useful feedbacks from them. Right before the conference, you should do some research about the schools and professors that will interview you, so that you can at least partially understand their needs.

When you are actually at a conference interview, just feel relaxed, answer the questions in the way you have prepared, and engage the professor(s) with your research, your teaching, and yourself. Your conference interview performance will have some impact upon whether you will

[3]See similar advice in Guo (2013).

[1]It is generally believed that the schools interviewing candidates at INFORMS are of higher rank than those doing interviews at DSI.

[2]According to the survey of Operations Academia, the average number of conference interview invitations is 14 in the 2013-2015 OM job market.

be invited for a fly-out, but not that much. Anyway, it is just a 30-min casual talk in which not so much additional information about you can be updated. Whenever possible, relate your own research and teaching experience with what they have, and demonstrate that you can contribute a lot to their group. With this strategy, you can, hopefully, increase your research fit $r_{i,j}$, your teaching fit $t_{i,j}$, and your enthusiasm/interest $I_{i,j}$. During my conference interviews, I sometimes mentioned my research related with their works and proposed future collaboration opportunities. I also explained my interest in teaching courses in a newly established program whenever it applied. It is not uncommon to have a conference interview at a hotel lounge which is crowded and noisy. In this case, you should speak clearly and loudly. In the last 5 minutes of the interview, you will have the opportunity to ask them some questions. Common questions are, e.g., teaching load, tenure process, and their specific needs. Finally, after finishing all the grueling interviews, you may want to write a short and sweet thank you note to each professor you met during the interviews. Ideally, each thank you note should be specific to what you have discussed with each interviewer. The thank you note is also a signal of your interest towards the school and a good indicator that you will become a kind and polite colleague.

5.3 Campus Interviews (Fly-outs)

The recruiting committee of each school will meet after the conference interviews to discuss who they should invite for a (serious) campus interview (i.e., fly-out). Soon after the conference interviews at INFORMS, I started to receive campus interview invitations[1]. The campus interview usually consists of a recruiting seminar (i.e., a job talk) in which you present to the faculty your research work (i.e., your job market paper), and a series of one-on-one meetings with the faculty members, each taking about 30 mins. The main purpose of the campus interview is for all the professors at the department to (a) have a concrete idea about your research and/or teaching, and (b) assess whether you can become a good colleague, potentially, for the rest of their lives.

The shortlist for campus interviews is usually 3-6 candidates. In most cases, the job offer will be given to someone on the shortlist[2]. The number of candidates that are still "alive" at a school, thus, drops significantly once the shortlist is formed. Therefore, getting campus interview opportunities is the *most crucial* step in the whole job market process. Unfortunately, this step is completely opaque to the poor candidates. But what criteria would the schools use to decide the shortlist for fly-outs? I haven't been sitting on any recruiting committee but would like to suggest, based on my experiences and observations, that the fly-out decisions are made based on the competitive advantage formula (**??**) as well. Thus, the four fundamental attributes (need, connection, communication, and qualification) matter here. In particular, the communication attribute will be assessed based on your performance at the conference interview. The connection and qualification attributes will be largely influenced by the strength of your letters. The need attribute will be clear after the candidate introduces his/her research and teaching backgrounds. As suggested by our model, the need attribute will also take into account the possibility that this candidate will actually join if an offer is made (largely determined by the candidate's enthusiasm/interest $I_{i,j}$, which is revealed during the conference interview). Some strong candidates may apply to a few lower-tier schools to hedge against the job market uncertainty risk. If a school anticipate that a candidate is too strong to accept the offer from them, the recruiting committee will not put him/her onto the shortlist so that the precious

[1] According to the survey of Operations Academia, the average number of campus interview invitations is 7 in the 2013-2015 OM job market.

[2] Sometimes, it occurs that a school has to hire someone so that they will keep inviting candidates for fly-outs until the position is filled. In this situation, the actual short-list could be quite long.

fly-out slots will not be wasted. Finally, I want to remark that if two candidates are from the same *top* PhD program, it is possible that a school will invite both of them for fly-outs.

As soon as I received the first campus interview invitation on November 12, 2015, I started preparing for my job talk. The preparation of your job talk starts with choosing the job market paper. It is recommended that the job market paper should strike a balance between the quality of the work and the preference of the school. In general, different schools have drastically different research tastes and preferences. So I strongly recommend you cater your presentation (or even the paper) to the specific research preferences of different schools. I chose to present different papers in different ways at different schools. For schools that appreciate technicalities, I presented a more technical paper and highlighted its technical contributions. For schools that care more about managerial insights, I presented a less technically challenging paper with more focuses on its motivations and insights. I also suggest you choose a paper that has received some feedbacks from other researchers (e.g., it has been reviewed in a top journal). The feedbacks can give you a sense of the potential questions you may face during the actual job talks.

You need to rehearse your job talks sufficiently many times both to yourself and to other audience, so that (a) you can familiarize yourself with the content and organization of your talk, (b) you can improve your presentation through feedbacks and revisions, and (c) you can well prepare handling potential questions. I practiced my job talks a few times with my advisors, classmates, and my wife in December 2015. I also practiced to myself at the frequency of once every other day for the whole month. To give a successful seminar, the first thing is to be really familiar with the content and organization of the presentation. The easiest way to familiarize yourself with your job talk is to practice it with yourself for dozens of times. The next step is to present it for a couple of times to an audience consisting of both people who are familiar with your work (e.g., your advisor(s)) and people unfamiliar with it. The audience feedbacks could help you polish the slides, the organization, the content, the expressions, the voice, and the postures of your talk. Any questions asked during the rehearsals will potentially be asked at the actual job talks. Having the answers to these questions prepared will definitely smoothen your question handling on the spot. Finally, running overtime is *strictly prohibited* at a job talk[1]. Practices will enable you to have a good sense of time and pace so that you can always stay on time.

The preparation for the one-on-ones is similar to that for conference interviews. You prepare for the answers for the three questions (i.e., your PhD research, your future research, and your teaching) ahead of time, and research each professor and the department before your trip. Since you have already gone through dozens of conference interviews, you should have no problem at all to prepare for the one-on-one meetings. Again, the main purpose of the preparation is to understand the departmental and each individual professor's needs.

From January 5 to February 3, 2016, I flew out to 9 schools for the campus interviews of 8 positions[2]. It is quite an exciting experience since I had tons of opportunities to show myself to the OM research community. The job talk is a main event for the campus interview. You will have no possibility to get an offer if you screw it up. In particular, the job talk performance will be a main indicator of teaching potential for the candidates who have never taught (as an instructor) before. I have three main suggestions for doing the job talk: (a) Present your research work enthusiastically and accessibly as if you are telling an interesting story to your friends, (b) Handle the questions and interruptions gracefully, and (c) Keep close track of the

[1]The length of a job talk in OM is usually 1 hour to 90 mins.

[2]I did two fly-outs for the position at NYU Shanghai, one at NYU Stern, and the other at NYU Shanghai campus. I received 11 fly-out invitations in total, 2 of which were turned down due to lack of time and energy.

time. You should be very enthusiastic about your research. Otherwise, why should others care? Your passion during the job talk could help you engage and connect with your audience, and make them believe that you will become an enthusiastic researcher and teacher for the next decade. Very likely none of your audience has ever read your job market paper (anyway you will present it, right?), so it is important to present your research in an accessible way. Your talk shouldn't be too dense or fast. It is a good idea to relate your research to practical examples whenever applicable. For my job talks, a large proportion of the time was devoted to answering various questions. This also resembles the actual classes, where you will face a lot of questions from the students. To handle the questions and interruptions well, you should pay attention to both *what* answers you should provide, and *how* you communicate your answers. The latter is usually more important. If you understand your research well and prepare for the possible questions upfront, then you should more or less have the answers to each question you may face during the job talks. On top of this, the key to handling question well is that you should make the questioner feel respected, important and intelligent. Do not view questions as a means of challenging your research, but as an indicator of the audience's interests. Hence, you should show your enthusiasm in communicating your research with others through your responses to the questions. Since the number of questions is uncertain during a job talk, you should be aware of the time throughout your presentation. In particular, you should have a clear idea on what to skip/deemphasize when the remaining time is not enough to cover everything. Again, the last thing you want to do at your job talk is running overtime.

As I commented earlier, the one-on-ones are quite similar to the conference interviews. So I will not repeat the tips here. At this stage, individual meeting is a good time to ask about some specific questions you are interested in. For example, I was considering doing a one-year post-doc in a company like IBM or Google before starting my academic job. So I asked about the possibility of postponing the job offer for 1 year at each campus interview. Usually, each candidate will have meals together with the faculty during the campus interview. Mealtime conversations are quite casual, so it is suggested that you can ask about the life in the surrounding area. I usually discussed with the hosting faculty about child care and kindergarten issues in the city where the school is located, since I have a daughter who will go to preschool soon. Sometimes, you will be scheduled to meet the dean. As long as you do not screw this meeting up, it will have little impact upon your case. After each campus interview, you should write a (preferably customized) thank you note to each professor you met during the campus visit.

To conclude this subsection, I would like to remark that the campus interview is also a great opportunity for you to know about the school. It would be great if you can have some things in mind to observe and to ask during each campus interview. The information you collected from the campus interviews will be crucial for your decision on which offer to take.

5.4 Decisions

We are almost there now! After finishing interviewing all the shortlisted candidates, the recruiting committee of each school will meet again to decide who to extend an offer to. They will contact their top choice(s) first to see the availability. If the top candidate is no longer available, they will possibly extend an offer to another candidate, or they may carry the position over to the next year.

It is often suggested by a lot of people that the only thing that matters to get an offer is your campus interview performance. I personally do NOT fully agree with this opinion. Let's

revisit the formula for a candidate i's competitive advantage at school j (**??**). The campus interview performance of candidate i at school j will influence the communication attribute Z_i significantly, and the qualification attribute $Q_{i,j}$ partially (research R_i may change after the campus interview). However, the other two fundamental attributes, need $X_{i,j}$ and connection $Y_{i,j}$, will only be influenced by the campus interview performance to a very limited, if any, degree. Whether a candidate meets the need of a school can be well judged by his/her CV and what is revealed during the conference interview, whereas the connection is obviously not impacted by the campus interview at all. Therefore, my conclusion is that, although the campus interview performance is very important for a candidate to get an offer from a school, it is far from the sole determinant.

In fact, even after the campus interview, a candidate could still increase his/her chance of getting the offer from a school by showing interest. Your enthusiasm towards a school will enhance the need attribute $X_{i,j}$ (via increasing $I_{i,j}$). Thus, it is recommended that you keep in touch with the schools you are still interested in and show your interest. On the other hand, if you are actually *not* interested in a school, do not pretend so that the offer can be extended to another deserving candidate.

I was fortunate and grateful to get three job offers, one on January 23, 2016, one on February 2, 2016, and one on February 10, 2016. NYU Shanghai is my top choice among the schools that invited me for a campus interview, and they made me an offer on February 10, 2016, which essentially concluded my job search in this job market season. For the rest of this section, I would like to discuss the final issues related to multiple offers and negotiations.

As soon as you get the second offer, you will have to decide which one to choose. Usually, once receiving an offer, you will be given 2 weeks to decide whether you want to join the school. My suggestion would be that you should think carefully about what you want and what each school could offer. Haphazard decisions should be avoided since you are going to stay there potentially for the rest of your life. There are 3 aspects of the school that I consider as important when deciding where to go: (a) reputation/strength of the school in the OM community, (b) research support and environment, and (c) happiness of my family living where the school is located. My career goal is to make impactful contributions towards the Operations Management field and, more preferably, the whole society. Therefore, I care about whether the school can offer me a high platform and top scholars as colleagues to realize my career ambition. The other important aspect is the potential research support provided by the school and the colleagues. In particular, I care about whether the school encourages research and try to pave the way for junior faculty to do research. The environment of the department is also important, and I value a collegial and supportive working environment a lot. The final aspect is not about career but about living. Of course, I won't go to a place if my family and myself do not feel happy living there. I am very much grateful that NYU Shanghai is an ideal place that excels in all three aspects. Another factor a candidate may want to consider is the difficulty and fairness of getting tenure. After all, the primary goal of a junior professor is to get tenure. But this does not apply to my case, since I am the first full-time operations faculty member at NYU Shanghai. There are no prior records for my reference.

After you decide where you want to go, it is time to negotiate about the terms in your offer. Keep in mind that you are negotiating with your future colleagues. Thus, you should be respectful and not greedy. It is suggested that you *only* negotiate over what is most important for you. For a typical junior professor at a research school, the most important terms are generally related to research support, such as teaching load and research fund[1]. It is not suggested to

[1]If you have an offer from an IEOR department, things that matter are start-up fund, student support, lab

negotiate too much about compensation since the starting salary is not that important for a junior faculty member. If you have a two-body problem, this is also a good time to bring it up. After the negotiations, you just sign the offer letter and congratulations on officially getting a job in the OM academia!

6 Conclusion and Useful Resources

Pursuing a PhD and searching for a tenure-track faculty position in Operations Management are really all-consuming. You need to work super hard on research, which by nature involves significant uncertainty. The job market itself is very challenging, and you have to be very strong-minded to navigate through this exhausting process. The key takeaway message of this document is that, to prepare for the OM job market, a PhD student should develop the four fundamental attributes in a balanced manner during the graduate study: **Need**, **Connection**, **Communication**, and **Qualification**. I hope my sharings can be helpful for prospective OM job market candidates.

6.1 Useful Resources

To conclude this document, I would like to recommend a few useful resources for a PhD student who wishes to find a tenure-track faculty job in Operations Management.

- Nagaraj (2010) "A Guide to Business PhD Applications". This article is a guide for business PhD applicants. The first 5 chapters of Nagaraj (2010) discuss the basic mechanism of the faculty and PhD programs in business schools.
- Guo (2013) "Reflections on my tenure-track assistant professor job search". This article is on the junior-level faculty search in Computer Science. However, the author offers tons of valuable suggestions that also apply to Operations Management. This article takes the perspective of a job market candidate.
- Welsh (2012a,b,c,d) "How to get a faculty job, Part 1, Part 1b, Part 2, Part 3". This is a blog series on the faculty job search in Computer Science. Again, it contains quite a few suggestions that are also applicable to the OM market. This blog series takes the perspective of the recruiting committee.
- Asher (2001). "Even a Geek Can Speak". This is a cool book on how to perfect your presentation skill, especially for a talk with highly technical content. I strongly recommend every PhD who wishes to pursue an OM academic career read it.
- Philip J. Guo's blog posts. `http://www.pgbovine.net/writings.htm`. A large portion of this blog is devoted to discussing interesting issues in academia. The topics include, but are not limited to, paper writing, grant application, student advising, and time management, all of which are of great interests to PhD students and junior faculty members.

space, etc.

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Biography

Renyu (Philip) Zhang will move to New York University Shanghai as an Assistant Professor of Operations Management in September 2016. He has been pursuing his PhD degree in Business Administration (Operations and Manufacturing Management) at Olin Business School, Washington University in St. Louis, since Summer 2011, when he received the B.S. degree in Mathematics from Peking University. He is particularly enthusiastic about devoting his intellectual efforts to two streams of research: (a) operations management under social interactions (e.g., social networks, sharing economy, and online markets) and (b) sustainable operations. Please visit his personal website for more about him: `http://students.olin.wustl.edu/~zhangr/index.htm`.

References

[1] Asher, J. 2001. *Even a Geek Can Speek: Low-Tech Presentation Skills for High-Tech People.* Persuasive Speaker Press, Atlanta, GA.

[2] Guo, J.P. 2013. Reflections on my tenure-track assistant professor job search. `http://www.pgbovine.net/guo-faculty-job-search.pdf`.

[3] Nagaraj, A. 2010. A guide to business PhD applications. `http://web.mit.edu/nagaraj/files/phdguide.pdf`.

[4] Wang, X., J. Zhang. 2015. Proces flexibility: A distribution-free bound on the performance of $k-$chain. *Operations Research.* **63**(3) 555-571.

[5] Welsh, M. 2012a. How to get a faculty job, Part 1: The application. `http://matt-welsh.blogspot.com/2012/12/how-to-get-faculty-job-part-1.html`.

[6] Welsh, M. 2012b. How to get a faculty job, Part 1b: How to get an interview? `http://matt-welsh.blogspot.com/2012/12/how-to-get-faculty-job-part-1b-how-to.html`.

[7] Welsh, M. 2012c. How to get a faculty job, Part 2: The interview. `http://matt-welsh.blogspot.com/2012/12/how-to-get-faculty-job-part-2-interview.html`.

[8] Welsh, M. 2012d. How to get a faculty job, Part 3: Negotiating the offer. `http://matt-welsh.blogspot.com/2013/01/how-to-get-faculty-job-part-3.html`.